UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

JAN 17 2001

OFFICE OF THE REGIONAL ADMINISTRATOR

MEMORANDUM

SUBJECT: Perchlorate Contamination Update

FROM: Felicia Marcus, Regional Administrator

TO: See Below

As a result of recent findings of widespread perchlorate contamination, in October 1997 and again in May 1998 Region 9 provided information to you regarding perchlorate and known manufacturers and users nationwide. There have been some very positive developments and some additional information that we feel are important enough to draw to your attention. The paragraphs below summarize EPA's progress in understanding toxicity especially to children, the increasing discovery of perchlorate in the environment throughout the U.S., the evidence that perchlorate is often released to soil and groundwater from open burn/open detonation ordnance disposal, and EPA's experience with analytical and treatment methods. With the addition of perchlorate to the Unregulated Contaminant Monitoring Regulation in 2001, all Regions should be prepared for the possibility that this chemical could show up in a water supply sample.

As we mentioned before, perchlorate (ClO_4^-) is a man-made inorganic salt used in solid rocket fuel, in munitions and in the pyrotechnics industry. Perchlorate in its various chemical forms is essentially as soluble as table salt, can persist for decades in the environment, and easily dissolves and moves through both groundwater and surface water.

Toxicity Assessment

In December 1998, EPA scientists expressed concern that perchlorate, which is known to disrupt thyroid activity at high concentrations, may pose a serious threat to developmental processes in children. We had hoped to resolve this issue through a final EPA toxicity assessment in early 2001, but we have been informed that delays in submittal of the critical toxicity studies will postpone the assessment indefinitely. EPA continues to recommend the continued use of the 1995 provisional reference dose range, which translates to 4 to 18 ppb in drinking water. Texas and Arizona have made their own assessments based on the developmental threats, and California

is currently drafting a public health goal that takes children's health into account. These independent assessments are in the general range of EPA's provisional reference dose. We do not have any information suggesting the eventual health-based level for perchlorate in drinking water will be any higher. When the draft toxicity assessment for perchlorate does become available for review, we would encourage the thoughtful participation of all EPA Regions.

Occurrence

With the assistance of contacts in all ten Regions, we have produced the two attached maps, one showing the locations of documented users and manufacturers of perchlorate and the other showing locations of known perchlorate releases to the environment. The users and manufacturers map is based primarily on the lists we sent you in May 1998. Only a small percentage of the perchlorate-using facilities have actually been investigated. However at essentially every listed facility where an effort has been made to test for perchlorate, perchlorate has been found in the soil or groundwater. A recently emerging trend is the discovery of perchlorate contamination at Open Burn/Open Detonation sites at both military bases and private facilities throughout the U.S. Again relatively few of all possible OB/OD locations have been tested for perchlorate. These results suggest that perchlorate should be added to the list of chemical tests when soil or water samples are taken at or near these sorts of facilities. We understand that there are a number of states throughout the country where no samples have been analyzed for perchlorate at all, even though potential sources exist in every part of the US. The distribution of perchlorate occurrence shown on the enclosed map may simply be an artifact of the effort made to search for perchlorate.

As of this month perchlorate is included in the Unregulated Contaminant Monitoring Regulation (UCMR) administered nationally by the Office of Water. Preliminary work sponsored by the American Water Works Research Foundation suggests that few major water supply agencies will have a problem with perchlorate, other than those already identified. It would be prudent to be prepared for unanticipated detections of perchlorate resulting from the UCMR program.

Analytical Methods

The March 2, 2000 Federal Register identified EPA Method 314.0 as the approved method for perchlorate analysis, effective January 1, 2001. Laboratories Approved for Perchlorate Analysis in Support of List 1, Assessment Monitoring Under the Revised Unregulated Contaminant Monitoring Regulation can be found at www.epa.gov/safewater/standard/ucmr/aprvlabs.html . The laboratories listed have successfully completed and passed the EPA-coordinated spring or fall 2000 perchlorate performance testing study. Other laboratories that have been approved for perchlorate testing by California Department of Health Services - one of the originators of the analytical procedure - are listed in California's useful perchlorate web site: http://www.dhs.ca.gov/ps/ddwem/chemicals/perchl/labs.htm. A number of advances in perchlorate analyses have been published in the academic literature, with reported improvements in detection as low as 0.05 parts per billion in drinking water.

Treatment Technologies

Although biological and ion exchange treatment technologies are currently being implemented at large-scale in California, Nevada and other states, perchlorate treatment remains fairly expensive. More common methods for treating contaminated groundwater such as activated carbon filtration or air stripping are not effective for removing perchlorate. EPA, Department of Defense and private industry are funding research to develop perchlorate treatment technology.

EPA's web site at www.epa.gov/ogwdw/ccl/perchlor/perchlo.html is being updated and should be a good information source. Please feel free to contact Kevin Mayer of my staff at (415) 744-2248 if you have any questions or need additional information.

3 Enclosures: Two Maps and One Table of Perchlorate Occurrence In U.S.

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TABLE 1. OCCURRENCE AND POTENTIAL SOURCES OF PERCHLORATE RELEASES TO THE ENVIRONMENT as of NOVEMBER, 2000. [a]

State	Location	Suspected Source	Type of Contamination	Max. Conc. ppb
AZ	Apache Nitrogen Products Benson, AZ	Explosives Manufacturing	Monitoring Well	670
AZ	Aerodyne Gila River Ind. Res., Chandler, AZ	Propellant Testing	Monitoring Well	18
AZ	Davis Monthan AFB Tucson, AZ	Explosives/ Propellant Disposal	Soil	Not Confirmed
AZ	Unidynamics Phoenix Inc. Phoenix Goodyear Airport Goodyear, AZ	Explosives/Ordnance Manufacturing	Monitoring Well	80
AZ	Universal Propulsion Phoenix, AZ	Rocket Manufacturing	Soil	--
AZ	Unidynamics Phoenix Inc. White Tanks Disposal Area Maricopa County, AZ	Explosives/ Ordnance Disposal	Public Water Supply Well (Unconfirmed Report) Soil	(4) --
AR	Atlantic Research East Camden, AR	Rocket Manufacturing Disposal - Open burn/ Open detonation	Monitoring Well Surface Water Soil	1,500 480,000 --
CA	Aerojet General also affects Mather AFB Rancho Cordova, CA	Rocket Manufacturing	Public Water Supply Well Monitoring Well	260 640,000
CA	Alpha Explosives Lincoln, CA	Explosives Manufacturing	Monitoring Well Reported in Surface Water	67,000
CA	Boeing/ Rocketdyne, NASA at Santa Susana Field Lab USDOE Santa Susana, CA	Rocket Research, Testing and Production	Monitoring Well	750
CA	Edwards AFB Jet Propulsion Lab, North Base Edwards, CA	Rocket Research	Monitoring Well	300
CA	El Toro Marine Corps Air Station Orange Co., CA	Explosives Disposal	Monitoring Well	380
CA	Lawrence Livermore National Laboratory Site 300 Tracy, CA	U.S. Dept. of Energy Explosives Research	Monitoring Well	84
CA	Lockheed Propulsion Upper Santa Ana Valley Redlands, CA	Rocket Manufacturing	Public Water Supply Well	87

(a) - Information from Mayer (2000). All reports have been confirmed by federal, state or county agencies except where noted. Soil concentrations are not listed.

TABLE 1.(continued) OCCURRENCE AND POTENTIAL SOURCES OF PERCHLORATE RELEASES TO THE ENVIRONMENT as of NOVEMBER, 2000. [a]

State	Location	Suspected Source	Type of Contamination	Max. Conc ppb
CA	NASA - Jet Propulsion Lab Raymond Basin Pasadena, CA	Rocket Research	Public Water Supply Well	54
CA	Rialto, CA	Fireworks Facility (?) B.F. Goodrich(?) Rocket Research and Manufacturing	Public Water Supply Well (inactive)	811
CA	San Fernando Valley Glendale, CA	Grand Central Rocket (?) Rocket Manufacturing	Monitoring Well	84
CA	San Gabriel Valley Baldwin Park, CA	Aerojet Rocket Manufacturing	Public Water Supply Well Monitoring Well	159 2,180
CA	San Nicholas Island Ventura Co., CA	U.S. Navy Firing Range	Public Water Supply (Springs)	12
CA	UTC (United Technologies) San Jose, CA	Rocket Testing	Monitoring Well	180,000
CA	Whittaker-Bermite Ordnance Santa Clarita, CA	Ordnance Manufacturing	Public Water Supply Well	47
CA	Whittaker Ordinance Hollister, CA	Ordnance Manufacturing	Private Well Monitoring Well	810 88
IN	American Water Works Service Greenwood, IN	Unknown source	Public Water Supply Well (Unconfirmed Report)	(4)
IA	American Water Works Service Clinton. IA	Unknown source	Public Water Supply Well (Unconfirmed Report)	(6)
IA	Ewart, IA	Unknown source	Monitoring Well	29
IA	Napier	Agriculture(?)	Monitoring Well	10
KS	Herington, KS	Ammunition Facility	Monitoring Well	9
MA	Massachusetts Military Res. Barnstable Co., MA	Disposal - Open burn/ Open detonation	Monitoring Well	100
MD	Naval Surface Warfare Center Indian Head, MD	Propellant Handling	Waste Discharge to Surface Water	>1,000
MD	White Oak Fed. Research Center (Naval Surface Warfare Center) White Oak, MD	Propellant Handling	Monitoring Well	72
MO	ICI Explosives Joplin, MO	Explosives Facility	Monitoring Well	107,000

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TABLE 1.(continued) OCCURRENCE AND POTENTIAL SOURCES OF PERCHLORATE RELEASES TO THE ENVIRONMENT as of NOVEMBER, 2000. [a]

State	Location	Suspected Source	Type of Contamination	Max. Conc. ppb
NE	Lewiston, NE	Agricultural Chemical Facility	Shallow Private Well	5
NE	Mead, NE	Fireworks Facility	Monitoring Well	24
NV	Kerr-McGee/BMI Henderson, NV	Chemical Manufacturing	Public Water Supply Monitoring Well Surface Water	16 3,700,000 120,000
NV	PEPCON Henderson, NV	Chemical Manufacturing	Monitoring Well	600,000
NM	American Water Works Service Clovis, NM	Unknown	Public Water Supply Well (Unconfirmed Report)	(4)
NM	Fort Wingate Depot Activity Gallup, NM	Explosives Disposal	Monitoring Well	2,860
NM	Holloman AFB Alamogordo, NM	Rocket Testing	Monitoring Well Seasonal Surface Water Soil	40 16,000 --
NM	Los Alamos National Lab Los Alamos, NM	U.S. Dept of Energy Lab Chemicals	Public Water Supply Well Monitoring Well Deep Borehole Water	3 220 1,662
NM	Melrose Air Force Range Melrose, NM	Explosives	Public Water Supply Well	25
NM	White Sands Missile Range White Sands, NM	Rocket Testing	Monitoring Well Soil	21,000 --
NY	Westhampton Suffolk County, NY	Unknown Source, Possibly Agricultural	Public Water Supply Well Monitoring Well	16 3370
NY	Yaphank Suffolk County, NY	Unknown Source	Private Well Monitoring Well	24 122
PA	American Water Works Service Yardley, PA	Unknown	Public Water Supply Well (Unconfirmed Report)	(5)
TX	Longhorn Army Ammunition Depot Karnak, TX	Propellant Handling	Monitoring Well Reported in Surface Water Soil	169,000 -- --
TX	McGregor Naval Weapons Plant McGregor, TX	Propellant Handling	Monitoring Well Reported in Surface Water Soil	91,000 — --
TX	PANTEX Plant (USDOE) Amarillo, TX	Explosives	Monitoring Well	5
TX	Red River Army Depot Texarkana, TX	Propellant Handling	Monitoring Well	80

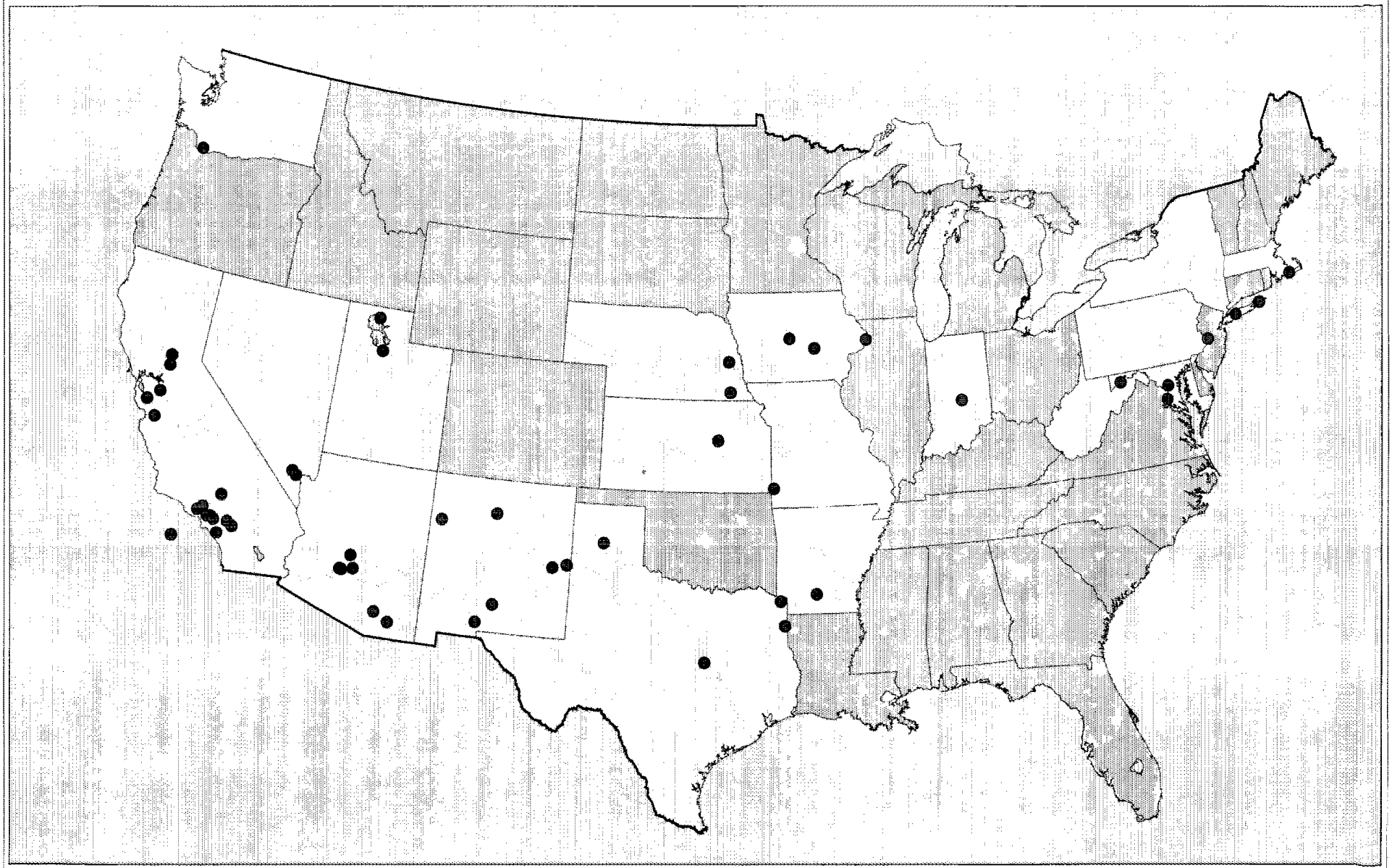
(a) - Information from Mayer (2000). All reports have been confirmed by federal, state or county agencies except where noted. Soil concentrations are not listed.

TABLE 1.(continued) OCCURRENCE AND POTENTIAL SOURCES OF PERCHLORATE RELEASES TO THE ENVIRONMENT as of NOVEMBER, 2000. [a]

State	Location	Suspected Source	Type of Contamination	Max. Conc. ppb
UT	Alliant Tech Systems Magna, UT	Rocket Manufacturing	Public Water Supply Well	16
UT	Thiokol Promontory, UT	Rocket Manufacturing	Water Supply Well (Inactive)	42
WA	Camp Bonneville near Vancouver, WA	Explosives/Propellant Disposal	Soil	--
WV	Allegheny Ballistics Lab Rocket Center, WV	Rocket Research, Production, Open burn /Open detonation	Surface Discharge of Groundwater Extraction	400

(a) - Information from Mayer (2000). All reports have been confirmed by federal, state or county agencies except where noted. Soil concentrations are not listed.

U.S. Perchlorate Releases



- Confirmed Sites
- Unconfirmed Sites
- Urbanized Areas
- Major Rivers
- Affected States

N

Scale: 1:20,000,000

200 0 200 400 Miles

Sources

1. USEPA Regions 3, 6, 7, 9, 10
2. California Department of Health Services
3. Arizona Department of Environmental Quality
4. New Mexico Environmental Department
5. Texas Natural Resource Conservation Commision
6. Utah Department of Environmental Quality
7. West Virginia Division of Environmental Protection
8. Suffolk County, New York, Department of Health Services
9. Siddiqui et. al. 1998

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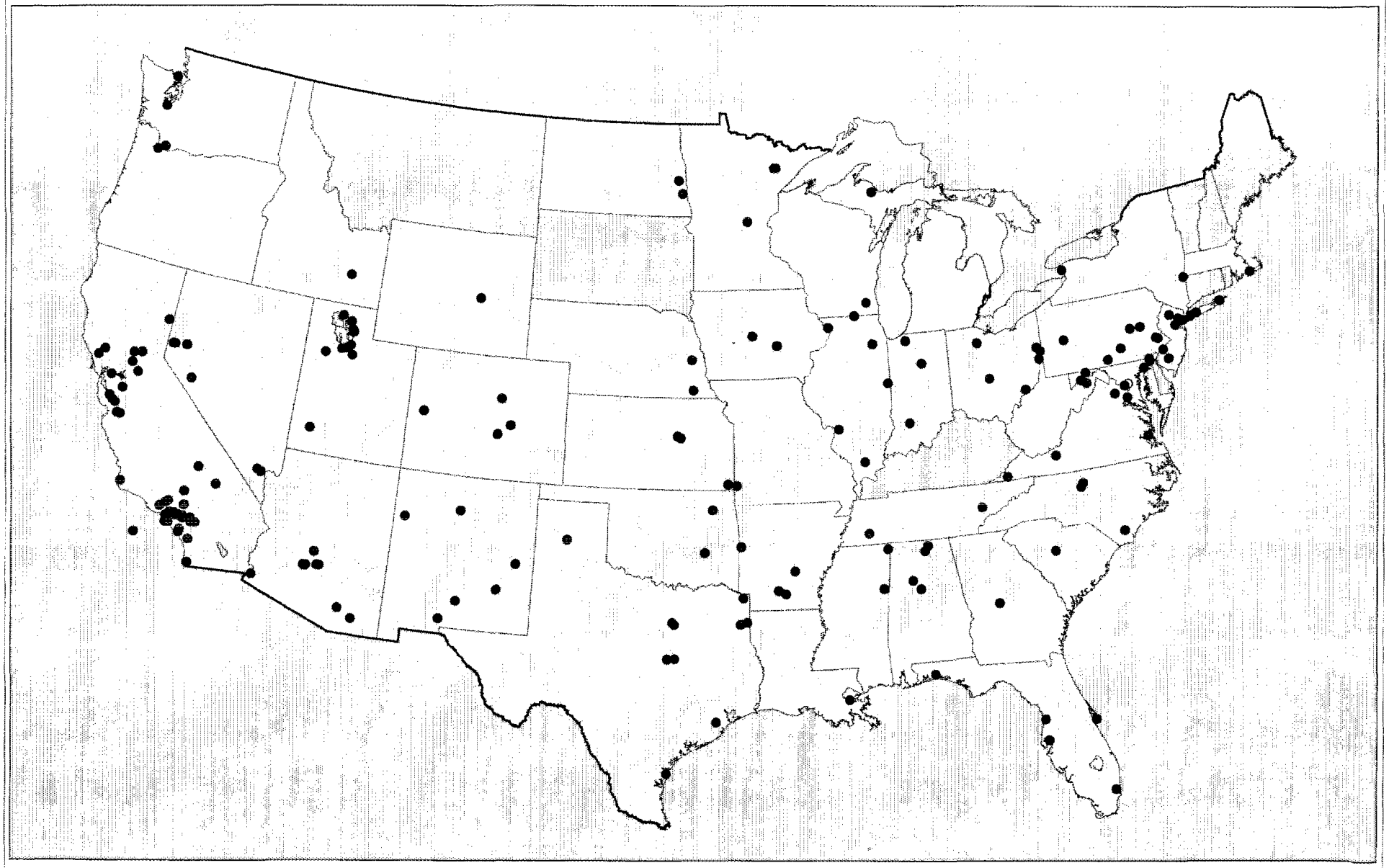
U.S. Perchlorate Manufacturers and Users



● Perchlorate Sites
Urbanized Areas
Major Rivers
Affected States

N

Scale: 1:20,000,000

200 0 200 400 Miles

Sources

1. Region 9 Memo, May 1998; Kerr-McGee's 104(e) Response
2. Department of Defense Information Request
3. American Pacific Non-CBI 104(e) response
4. Letter from J.V. Lovell regarding PEPCON litigation, August 17, 1990
5. USEPA Regions 3, 6, 7, 9, 10
6. California Department of Health Services
7. Arizona Department of Environmental Quality
8. New Mexico Environmental Department
9. Texas Natural Resource Conservation Commission
10. Utah Department of Environmental Quality
11. West Virginia Division of Environmental Protection
12. Suffolk County, New York, Department of Health Services
13. Siddiqui et al. 1998
14. US Department of Energy
15. Schumacher, 1960

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